wheel when one pair of engaging pins were in a vertical plane, thus causing the companion pair to move horizontally, as is indicated in Figs. 4 and 5, but that if the axle were turned to another angle, as is shown in Figs. 6 and 7, the steering movement would be wholly against the rotative force of the motor. To obviate this difficulty, each groove is widened at its opposite ends 22^a to give a clearance, the contour of the walls being preferably of reversed ellipsoidal form.

The steering may be effected by means of a spindle 35, which has a bearing in a bracket 36, projecting from a clip 37, surrounding one of the axle-sleeves. Upon this spindle is fixed a partial pinion 38, which meshes with a rack 39, carried by a bar 40. This bar is shown as guided by rolls 41, mounted upon arms 42, which project from the bracket. To the opposite ends of the bar are articulated links 43, which connect the steering-bar with arms 44, fixed to the casings by screws 45. Projecting from each of the upper casing-arms is a bracket 46, to which and to the body 47 of the vehicle supporting-springs 48 are connected by links 49.

In operation the axles are rotated through the differential gearing and drive the wheels by the contact of the hub projections with the grooves in the balls upon the axles. The hub-flanges by their coöperation with the grooves in the casings and the support of these casings upon the slotted arms allow the wheels to be turned to direct the course of the vehicle by swinging said casings through the movement of the steering-bar, at the same time maintaining them in their true vertical relation. Thus by my improved organization the vehicle may be driven by the application of power to its supporting-axle without interfering with the flexibility of movement or sensibly weakening the structure. Moreover, the manner in which the relatively movable surfaces are inclosed tends to exclude dust and prevents undue wear.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination with a frame, of an axle rotatable therein, wheels movable upon the axle but constrained to rotate therewith, an annular guide member pivoted about a fixed point upon the frame, and an annular projection from the wheel coacting with the guide member.

2. The combination with a frame, of an axle rotatable therein, wheels movable upon the axle but constrained to rotate therewith, an annular guide member pivoted about a fixed point upon the frame and provided with a groove, and an annular projection from the wheel operating in the groove.

3. The combination with a frame, of an axle rotatable therein, wheels movable upon the axle but constrained to rotate therewith, an annular guide member pivoted about a fixed point upon the frame, an annular projection from the wheel coacting with the guide member, and steering mechanism attached to the guide member.

4. The combination with a frame, of an axle rotatable therein, an arm fixed to the frame, a casing swinging upon the arm, a wheel having rotatable engagement with the axle and being mounted to swing thereon, and a projection from the wheel engaging the casing.

5. The combination with a frame, of an axle rotatable therein, an arm fixed to the frame, a casing swinging upon the arm and being provided with an annular groove, a wheel having rotatable engagement with the axle and being mounted to swing thereon, and an annular flange extending from the wheel into the casing-groove.

6. The combination with a frame, of an axle rotatable therein, an arm fixed to the frame, a casing mounted upon the arm, said casing and arm having a coacting projection and slot, a wheel having rotatable engagement with the axle and being mounted to swing thereon, and a projection from the axle engaging the casing.

7. The combination with a frame, of an axle rotatable therein, an arm fixed to the frame and provided with a curved slot, a casing having a projection engaging the slot, a wheel having rotatable engagement with the axle and being mounted to swing thereon, and a projection from the axle engaging the casing.

8. The combination with a frame, of an axle rotatable therein, a ball carried at the end of the axle and being provided with grooves increasing in width at their ends, and a wheel having a socket to receive the ball and projections engaging the grooves.

9. The combination with a frame, of an axle rotatable therein, a ball carried at the end of the axle and being provided with grooves, a wheel having a socket to receive the ball and projections engaging the grooves, a casing carried by the frame and being provided with an annular groove, and an annular flange extending from the hub of the wheel into the casing-groove.

10. The combination with a frame, of an axle rotatable therein, a ball carried at the end of the axle and being provided with grooves, a wheel having a socket to receive the ball and projections engaging the grooves, an arm fixed to the frame and having a slot curved in an arc struck from a vertical axis through the ball, a casing provided with a projection cooperating with the slot, and a projection from the wheel engaging the casing.

11. The combination with a frame, of an axle rotatable therein, a ball carried at the end of the axle and being provided with grooves, a wheel having a socket to receive the ball and projections engaging the grooves, a casing carried by the frame and being provided with an annular groove, an annular flange extending from the hub of the wheel into the casing-